

ABSTRACT

An extremely compact prism optical element, image observation apparatus and image display apparatus which are capable of providing an observation image that is clear and has minimal aberration and minimal distortion even at a wide field angle. Light rays emitted from an image display device (7) enter an ocular optical system (12) through a fourth surface (6) and are totally reflected toward an observer's pupil (1) by a third surface (5). The reflected light rays are reflected by a first surface (3) disposed immediately in front of the observer's pupil (1) and then reflected toward the observer's pupil (1) by a second surface (4). The reflected light rays pass through the first surface (3) and are projected into an observer's eyeball (15) with the observer's iris position as an exit pupil (1). When an external-scene image is observed, light rays from an object point in the external scene enter the ocular optical system (12) through the third surface (5), pass through the first surface (3) and are projected into the observer's eyeball (15). Assuming that the angle of internal reflection of an arbitrary light ray at the third surface (5) is θ_{r3} , the ocular optical system (12) satisfies the condition of $\sin^{-1}(1/n_d) \leq \theta_{r3} \leq 60^\circ$, where n_d is the refractive index for the spectral d-line of the medium of the ocular optical system (12).